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ABSTRACT

Using a questionnaire, researchers surveyed 319 public high schools, each with fewer than 500 students, in 46 states to determine the extent and use of microcomputers in small high schools, to assess the use and users of correspondence courses in small schools, to identify the most frequently offered courses in small high school curricula, and to determine the need to add new courses. The majority of the schools (99%) had at least one microcomputer. The mean was 9.8 per school, or one computer for every 32.2 students. The schools used the computers most frequently for student instruction (especially in computer science, mathematics, and business courses), recordkeeping, and word processing. They reported that 21.4% of the teachers were computer literate and 45.4% were computer aware. Only 25% of school counselors frequently recommended correspondence courses to students needing additional credits. Most correspondence students were "D" or "F" students. The mean number of correspondence credits allowed towards graduation was 2.7. The four most frequently offered courses in small high school curricula were typing, English grammar, algebra, and biology. Principals felt they would most like to add courses in computer literacy, speech, word processing, computer programming, and remedial reading. (SB)

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A RESEARCH REPORT OF SMALL HIGH SCHOOLS IN THE UNITED STATES IN REGARDS TO CURRICULAR OFFERINGS, MICRO-COMPUTER USAGE, AND CORRESPONDENCE COURSES

A Study Completed for the
Division of Continuing Education
Brigham Young University

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by

Bruce Barker and Paul Petersen

INTRODUCTION

Objectives:

The major objectives of this study were (1) to determine the extent and use of microcomputers in small high schools across the United States; (2) to assess the use of correspondence courses in small schools, including why students enroll in correspondence courses and what type of student typically enrolls in such courses; (3) to identify the most frequently offered courses in the curriculum of the small high school; (4) to determine the relative need of adding new courses to the current curriculum; and (5) to collect miscellaneous data with regard to student enrollment, etc.

METHODOLOGY

Sampling and Instrumentation

The sample used for this study consisted of 475 operating public high schools with an enrollment of less than 500 students each. A mailing list, purchased from Market Data Retrieval Incorporated indicated a total of 5060 operating public high schools in the United States with enrollments of fewer than 500 students each. This did not include continuation, alternative, or speciality high schools, almost all of which enroll fewer than 500 students.

In November of 1983 a 135 item, self administered, questionnaire

was designed, pre-tested, and revised for the purpose of obtaining the aforementioned research objectives. In November 1983, questionnaires were mailed to principals in each of 475 high schools selected in the random sample. Between November 1983 and January 1984, questionnaires were returned from 319 schools, for a return rate of 67.2 percent. This included returns from schools across 46 different states.

Treatment of the Data

In February, 1984 all returned questionnaires were delivered to Computer Service personnel at Brigham Young University for data entry. The Statistical Analysis System (SAS) computer program for the social sciences was used to list the frequency distributions; and to calculate the mean, standard deviation, and range for each of the 135 variables taken from the questionnaire.

Research Questions

The research questions posed in this study were:

1. What is the average student enrollment in public schools of fewer than 500 students?

2. What is the student/teacher ratio in small public high schools which enroll 500 students or less?

3. What percentage of small high schools have computers?

4. What are the most common computer brand names in the schools?

5. What is the student/computer ratio?

6. How is the microcomputer used in the schools?

7. What percentage of the teaching staff is able to use the microcomputer for educational purposes?

8. To what extent are correspondence courses recommended by

school administrators?

9. Why do students take correspondence courses?

10. What type of student typically enrolls in a correspondence course(s)?

11. How many correspondence credits do schools allow students to apply toward graduation requirements?

12. What are the most frequently offered courses in the curriculum of the small high school and what courses do school administrators feel should be added?

FINDINGS

The information gathered for this study was taken from a 135 item, self administered, questionnaire which was mailed to 475 randomly selected principals in public high schools across the United States with fewer than 500 students. A total of 319 questionnaires were returned. High School principals in 46 different states participated in the study.

The exact number of operating public high schools in the nation which enrolled fewer than 500 students was determined to be 5060, based on information provided by Market Data Retrieval, Incorporated. This figure did not include alternative high schools, continuation high schools, or other speciality schools, almost all of which enroll fewer than 500 students.

Answers to Research Questions

1. What is the average student enrollment in public high schools of fewer than 500 students.

The mean student enrollment for the study was 296.8 students.

The range ran from 13 students to 499, with a standard deviation of 123.

2. What is the student/teacher ratio in public high schools which enroll 500 students or less?

The average number of full time teachers in the study population was reported to be 22.9 teachers per school. This resulted in a ratio of one full-time teacher for every 13 students.

3. What percentage of small high schools have computers?

Only three schools in the entire study reported that they did not have at least one microcomputer in their school. Those schools reporting ownership of at least one microcomputer was 99.0 percent. The mean number of microcomputers reported per school was 9.8 with a standard deviation of 6.6.

4. What are the most common computer brand names in the schools?

The most frequently reported brand names of microcomputers presently used in the schools were reported as follows:

Apple/Franklin	47.5 percent
Radio Shack/TRS-80	26.3 percent
Commodore	12.2 percent
Texas Instrument	3.6 percent
IBM PC	3.6 percent
Other	3.6 percent
Atari	3.2 percent

5. What is the student computer ratio?

Findings from the study indicate a ratio of one microcomputer for every 32.2 students. Under ideal conditions during a six hour instructional day, this would allow each student an average of less than 12 minutes on the computer.

6. How is the microcomputer used in the school?

From a list of possible functions, school principals were asked to rank order the purposes for which microcomputers were used in their schools. The most frequently reported use was for student instructional purposes followed by recordkeeping such as student attendance records, library inventory, etc. Ranked third was the use of microcomputers for word processing by office and staff. Other uses included managing the school budget, forecast planning, calculating large figures, and controlling light fixtures and thermostats, etc. (see Table 1).

Related to this question, principals were asked to list the courses in which microcomputers were used for instructional purposes in their schools. Almost 91 percent of the respondents reported the use of microcomputers for instructional purposes. Those subject areas in which computers are being used were broken down as follows:

Agriculture	9.1 percent
Business	14.2 percent
Computer Science	22.9 percent
Science	11.4 percent
Data or Word Processing	12.2 percent
English	11.1 percent
Foreign Language	2.8 percent
Math	15.8 percent
Science	11.4 percent

Principals were asked to indicate the source from which they acquired software programs. Listed in rank order, the sources were reported as follows: "purchased from a commercial supplier;" followed by, "provided by a consortium; programmed by personnel at either the school, district, or state office; acquired from a university;" or "programmed by a student(s) at the school." (see Table 2).

7. What percentage of the teaching staff is able to use the

TABLE 1

RANKING OF PURPOSES FOR WHICH COMPUTERS ARE USED IN SMALL HIGH SCHOOLS ENROLLING LESS THAN 500 STUDENTS. REPORTED BY PRINCIPALS, 1984.

Use	Frequency	Percent
Ranked as #1		
Student Instructional Use	259	90.9
Managing School Budget	5	5.4
Record Keeping (library, etc.)	2	1.4
Word Processing for Office	5	4.9
Control (thermostat, lights, etc.)	0	0
Ranked as #2		
Student Instructional Use	19	6.7
Managing School Budget	34	36.6
Record Keeping (library, etc.)	88	60.3
Word Processing for Office	49	40.2
Control (thermostat, lights, etc.)	2	8.7
Ranked as #3		
Student Instructional Use	5	1.7
Managing School Budget	29	31.2
Record Keeping (library, etc.)	40	27.4
Word Processing for Office	42	34.4
Control (thermostat, lights, etc.)	1	4.3

TABLE 2

RANKING OF SOURCES FOR COMPUTER SOFTWARE PROGRAMS IN HIGH SCHOOLS ENROLLING 500 STUDENTS OR LESS. REPORTED BY PRINCIPALS, 1984.

Source	Frequency	Percent
Ranked as #1		
Commercial Supplier	233	80.9
University or College	7	6.8
Programed by school, district or State office personnel	28	14.0
Programed by student(s)	6	4.1
Ranked as #2		
Commercial Supplier	36	12.5
University of College	42	40.4
Programed by school, district or State office personnel	112	56.0
Programed by student(s)	37	25.2
Ranked as #3		
Commercial Supplier	13	4.5
University or College	77	26.9
Programed by school, district or State office personnel	48	24.0
Programed by student(s)	63	42.8

microcomputer for educational purposes?

Principals reported that 21.4 percent of their instructional staff were computer literate. Computer literacy was defined on the research instrument as "familiar with how the computer functions and are able to write either simple or complex programs." In contrast, it was reported that 45.4 percent of the teachers were "computer aware," that is, "familiar with how the computer can be applied and are able to access and use software programs, but are unable to write simple programs."

8. To what extent are correspondence courses recommended by school administrators for students in their schools?

Principals were asked to indicate on a Likert type scale of "1" to "5" where "1" represented "not recommended" and "5" represented "frequently recommended", the degree to which counselors in their school recommended high school correspondence courses to students who desired or needed to earn additional credit. Results were as follows:

Rating	Frequency	Percent
1 (not recommended)	54	18.7
2	90	31.1
3	71	24.6
4	49	17.0
5 (frequently recommended)	25	8.6

9. Why do students take correspondence courses?

Principals were asked to rank order the three major reasons why students in their school who enroll for correspondence courses do so. The major reason was "to earn make-up credit" (86.6 percent), followed by "to resolve scheduling conflicts" (61.8 percent), and "to supplement the local curriculum" (41.8 percent). (See Table 3).

10. What type of student typically enrolls in a correspondence

TABLE 3

RANKING OF MAJOR REASONS HIGH SCHOOL STUDENTS ENROLL FOR CORRESPONDENCE COURSES. REPORTED BY PRINCPALS, 1984.

Reason	Frequency	Percent
Ranked #1		
Earn make-up credit	187	86.6
Supplement local curriculum	24	19.7
Prepare for College	14	12.4
Resolve scheduling conflicts	3	2.7
Ranked #2		
Earn make-up credit	21	9.7
Supplement local curriculum	44	36.1
Prepare for College	47	41.6
Resolve scheduling conflicts	64	61.8
Ranked #3		
Earn make-up credit	5	2.3
Supplement local curriculum	51	41.8
Prepare for College	35	30.9
Resolve scheduling conflicts	25	22.7

course(s)?

Total student enrollment in the study population was 93,188 students. Of these, it was reported that 950 students (1.02 percent) had enrolled in at least one correspondence course during the 1982-83 academic year. The mean number of students per school who enrolled in correspondence courses during 1982-83 was 4.1.

Of these students, principals indicated that 61.7 percent were either "D" or "F" students, 13.4 percent were "A" students, 13.4 percent were "C" students, and 11.6 percent were "B" students.

11. How many correspondence credits do schools allow students to apply toward graduation requirements?

The mean number of credits, based on the Carnegie Unit, which school administrators would permit students to apply toward graduation requirements was 2.7 per school. This ranged from a low of zero credits in 28 schools to a high of six or more credits in 50 schools. The standard deviation was 2.0.

12. What are the most frequently offered courses in the curriculum of the small high school and what courses do school administrators feel should be added?

On the questionnaire, principals were presented a list of 118 different courses and asked to indicated which of these courses were included as a part of the curriculum in their school. For courses which they did not offer, principals were asked to indicate on a Likert type scale of "1" to "5," where "1" represented "no need to offer the subject" and "5" represented "a great need to offer the subject," the relative degree which they felt the course should be added to their school's curriculum. Table 4 lists the 118 courses in

TABLE 4

CURRICULAR OFFERINGS IN HIGH SCHOOLS ENROLLING 500 STUDENTS OR LESS AND DEGREE OF INTEREST IN ADDING COURSES TO THE CURRICULUM ON A SCALE OF "1" TO "5" WHERE "1" REPRESENTS "NO NEED" AND "5" REPRESENTS "GREAT NEED". REPORTED BY PRINCIPALS, 1984.

Course	Percent Offered	Percent Not Offered	Mean of Relative Need
Agriculture			
1. Vocational Agriculture	64.0	36.0	1.9
2. Animal Husbandry	39.4	60.6	1.7
3. Forestry	15.3	84.7	1.5
4. Horticulture	38.6	61.4	1.8
5. Wildlife	12.5	85.5	1.7
Art			
6. Art Appreciation	53.2	46.8	2.5
7. Art History	37.0	63.0	2.1
8. Drawing & Painting	81.4	18.6	3.2
9. Crafts	70.9	29.1	2.3
10. Sculpture	47.9	52.1	2.0
11. Printing and Graphics	51.7	48.3	2.4
12. Advanced Art	67.3	32.7	1.3
Business Education			
13. General Business	74.4	25.6	2.6
14. Typing	99.7	0.3	1.0
15. Word Processing	57.2	42.8	3.6
16. Accounting	94.9	5.1	3.1
17. Business Math	72.5	27.5	2.4
18. Business Law	49.7	50.3	2.3
19. Busines Machines	78.8	21.2	2.9
20. Data Processing	41.7	58.3	3.2
21. Bookkeeping	86.8	13.2	2.0
22. Business Communications	42.8	57.2	2.3
23. Fashion Merchandising	10.5	89.5	1.6
24. Advertising	10.8	89.2	1.7
25. Real Estate Marketing	4.1	95.9	1.7
26. Basic Salesmanship	13.6	86.4	1.9
27. Finance & Credit	28.7	71.3	2.1
28. Food Marketing	20.5	79.5	1.9
29. General Merchandise Retailing	21.2	78.8	2.0
Computer Science			
30. Computer Literacy	80.3	19.7	4.2
31. Computer Programming	75.2	24.8	3.6

TABLE 4 (continued)

Courses	Percent Offered	Percent Not Offered	Mean of Relative Need
Foreign Language			
32. Spanish	64.1	35.9	2.8
33. French	32.2	67.8	2.1
34. German	17.0	83.0	1.9
35. Russian	0.3	99.7	1.7
36. Latin	4.8	95.2	1.8
37. English - 2nd Language	12.2	87.8	1.4
Home Economics			
38. Family Relations	93.9	6.1	2.3
39. Child Development	92.7	7.3	3.0
40. Food & Nutrition	97.8	2.2	2.3
41. Clothing Construction	96.2	3.8	2.0
42. Interior Design	65.3	34.7	2.0
43. Consumer Education	85.6	14.2	2.5
44. Home Nursing	24.2	75.8	2.2
Industrial Education			
45. General Shop	83.5	16.5	2.7
46. Drafting	76.9	23.1	3.0
47. Metalworking	66.4	33.6	2.6
48. Welding	80.6	19.4	2.8
49. Home Construction	50.7	49.3	2.3
50. Automotive Mechanics	57.7	42.3	2.7
51. Small Engines	67.9	32.1	2.8
52. Autobody Repair	23.8	76.2	2.3
Language			
53. Basic English	97.8	2.2	2.6
54. English Grammar	99.7	0.3	1.0
55. Composition	99.1	0.9	2.7
56. Creative Writing	81.8	18.2	3.4
57. American Literature	98.1	1.9	2.2
58. World Literature	72.1	27.9	2.6
59. Science Fiction	35.7	64.3	2.0
60. Short Stories	73.6	26.4	2.5
61. Tragedy & Comedy	49.8	50.2	2.1
62. Speech	76.5	23.5	3.8
63. Drama (Theatre Arts)	57.2	42.8	2.9
64. Remedial Reading	75.5	24.5	3.6
65. Speed Reading	14.2	85.8	2.8
66. Library Science	40.7	59.3	2.3
67. Journalism	67.0	33.0	3.0

TABLE 4 (continued)

Course	Percent Offered	Percent Not Offered	Mean of Relative Need
Mathematics			
68. General Math	96.8	3.2	2.6
69. Algebra	99.7	0.3	1.0
70. Advanced Algebra	95.6	4.4	2.4
71. Geometry	98.1	1.9	2.2
72. Advanced Geometry	37.2	62.8	2.4
73. Trigonometry	88.2	11.8	2.8
74. Calculus	55.6	44.4	2.8
75. Probability/Statistics	21.6	78.4	2.4
76. Logic	15.3	84.7	2.4
77. Consumer Math	80.7	19.3	2.7
78. Computer Mathematics	42.3	57.7	3.1
Personal Development			
79. Body Cond./Wt. Lifting	64.2	35.8	2.3
80. Health	93.3	6.7	3.1
81. Aerobics	30.2	69.8	2.1
82. Sex Education	59.8	40.2	2.9
83. First Aid & Safety	74.3	25.6	3.3
84. Dating & Courtship	38.8	61.2	2.5
85. Psychology	56.3	43.7	2.7
86. Health Occupations	35.2	64.8	2.4
87. Driver Education	92.7	7.3	2.4
Science			
88. General Science	87.1	12.9	2.1
89. Life Science	75.9	24.1	2.1
90. Biology	99.7	0.3	1.0
91. Genetics	38.8	61.3	2.1
92. Taxidermy	1.4	98.6	1.4
93. Physical Science	89.0	11.0	2.2
94. Chemistry	96.8	3.2	2.6
95. Physics	89.7	10.3	3.2
96. Earth Science	69.4	30.6	2.6
97. Astronomy	16.8	83.2	2.1
98. Geology	16.6	83.4	2.3
Social Studies			
99. State History & Gov't	82.5	17.5	3.1
100. U. S. History	99.4	0.6	1.0
101. U. S. Government	95.5	4.5	3.1
102. World Government	46.7	53.3	2.6
103. General Economics	52.8	47.2	2.8
104. Consumer Economics	60.1	39.9	3.0

TABLE 4 (continued)

Courses	Percent Offered	Percent Not Offered	Mean of Relative Need
Social Studies (continued)			
105. Current Events	68.5	31.5	3.0
106. Geography	76.1	23.9	3.4
107. Sociology	52.6	47.4	2.6
108. Philosophy	5.4	94.6	2.1
109. World Cultures	43.0	57.0	2.5
110. Anthropology	5.4	94.6	2.0
111. Ethnic History	11.1	88.9	1.9
Special Programs			
112. ROTC	1.7	98.3	1.4
113. Adv. Placement Biology	24.5	75.5	2.3
114. Adv. Placement Chemistry	13.7	86.3	2.3
115. Adv. Placement English	29.4	70.6	2.5
116. Adv. Placement History	8.6	91.4	2.3
117. Adv. Placement Math	23.5	76.5	2.4
118. Adv. Placement Physics	3.5	96.5	2.2

alphabetical order, by discipline; shows the percent which each course was offered in the study population and the percent not offered; and lists the mean, on a scale of "1" to "5," of the relative need to include each respective course for those not offered.

Table 5 lists, in rank order, the 50 most frequently offered courses and the percent of schools from the study population offering them.

Table 6 lists, in rank order, those courses not being offered in which the mean relative need to offer the course was reported by school principals to be 3.0 or above.

CONCLUSIONS

1. Most small high schools are attempting to acquire microcomputers as evidenced by the fact that 99.0 percent of all schools participating in the study had at least one microcomputer in their school and the mean number of computers per school was 9.8. Nevertheless, the student/computer ratio is still sufficiently large as to severely limit most students from having ample time to work on-line with the computer at school.

2. The most popular brand names of microcomputers in the schools are Apple and Franklin, followed by Radio Shack and TRS 80, then Commodore.

3. The major function for which microcomputers are being used in the schools is for student instruction. The subjects in which they are most frequently used are computer science, business and data or word processing, and in mathematics.

4. High school teachers are becoming increasingly aware of microcomputer technology and its applications for use in their

TABLE 5

RANK ORDER OF TOP 50 MOST FREQUENTLY OFFERED COURSES IN CURRICULUM FOR PUBLIC HIGH SCHOOLS OF 500 STUDENTS OR LESS. REPORTED BY PRINCIPALS, 1984.

Course	Ranking	Percent
Type	1	99.7
English Grammar	1	99.7
Algebra	1	99.7
Biology	1	99.7
U. S. History	5	99.4
English Composition	6	99.1
American Literature	7	98.1
Geometry	7	98.1
Food & Nutrition	9	97.8
Basic English	9	97.8
Chemistry	11	96.8
General Math	11	96.8
Clothing Construction	13	96.2
Advanced Algebra	14	95.6
U. S. Government	14	95.5
Accounting	15	94.9
Family Relations	17	93.9
Health	18	93.3
Driver Education	19	92.7
Child Development	19	92.7
Physics	21	98.7
Physical Science	22	89.0
Trigonometry	23	88.2
General Science	24	87.1
Bookkeeping	25	86.8
Consumer Education	26	85.6
General Shop	27	83.5
State History & Government	28	82.5
Creative Writing	29	81.8
Art - Drawing & Painting	30	81.4
Consumer Math	31	80.7
Welding	32	80.6
Computer Literacy	33	80.3
Business Machines	34	78.8
Drafting	35	76.9
Speech	36	76.5
Geography	37	76.1
Remedial Reading	38	75.5
Life Science	39	75.9
Computer Programming	40	75.2
General Business	41	74.4
First Aid and Safety	42	74.3
Short Stories (literature)	43	73.6
Business Math	44	72.5
World Literature	45	72.1

TABLE 5 (continued)

Course	Ranking	Percent
Crafts	46	70.9
Earth Science	47	69.4
Current Events	48	68.5
Advanced Art	49	67.3
Journalism	50	67.0

TABLE 6

COURSES NOT OFFERED IN CURRICULUM OF PUBLIC HIGH SCHOOLS ENROLLING 500 STUDENTS OR LESS WITH A RELATIVE MEAN VALUE OF 3.0 INDICATING NEED TO OFFER THE COURSE BASED ON A SCALE OF "1" TO "5" WHERE "1" REPRESENTS "NO NEED TO ADD THE COURSE" AND "5" REPRESENTS "GREAT NEED TO ADD THE COURSE." REPORTED BY PRINCIPALS, 1984.

Course	Rank	Mean Value of Need	Percent Not Offered
Computer Literacy	1	4.2	19.7
Speech	2	3.8	23.5
Word Processingq	3	3.6	42.8
Computer Programming	3	3.6	24.8
Remedial Reading	3	3.6	24.5
Creative Writing	6	3.4	18.2
Geography	6	3.4	23.9
First Aid & Safety	8	3.3	25.6
Data Processing	9	3.2	58.3
Drawing & Painting (Art)	9	3.2	18.6
Physics	9	3.2	10.3
Computer Mathematics	12	3.1	57.7
State History & Government	12	3.1	17.5
Health	12	3.1	6.7
Accounting	12	3.1	5.1
U. S. Government	12	3.1	4.5
Consumer Economics	17	3.0	39.9
Journalism	17	3.0	33.0
Current Events	17	3.0	31.5
Drafting	17	3.0	23.1
Child Development	17	3.0	7.3

teaching. This is evidenced by the fact that almost one fourth of all teachers in the study population were able to write computer programs and almost 50 percent were able to access and use software programs.

5. Correspondence courses are accepted by most high school administrators as a bonafide means by which students can earn credit to apply toward graduation. Nevertheless, only a very small percentage of students actually enroll for such courses and the majority of these are "D" and "F" students who need to earn make-up credit in order to graduate

6. Numerous courses are offered as a part of the curriculum in the typical small high school. Still, many administrators feel there is a need to add other courses to their school's curriculum. This is especially true in regards to computer literacy, speech, computer programing, word processing, remedial reading, and other selected courses.